# **ONKYO**. SERVICE MANUAL

# SERVO LOCKED FM/AM STEREO RECEIVER MODEL TX-3000





D model

G/W model

# **SPECIFICATIONS**

### AMPLIFIER SECTION

Output Power: 45 watts per channel, min. RMS,

at 8 ohms both channels driven,

from 20 Hz to 20,000 Hz, with no more than 0.04% total

harmonic distortion.

Total Harmonic

Distortion: 0.04% at rated power

0.04% at 1 watt output

IM Distortion: 0.1% at rated power 0.04% at 1 watt output

40 at 8 ohms Damping Factor:

 $20 \text{ Hz} - 30,000 \text{ Hz} (\pm 1 \text{ dB})$ Frequency Response:

RIAA Deviation:  $20 \text{ Hz} - 20,000 \text{ Hz} (\pm 0.8 \text{ dB})$ Sensitivity & Impedance: 2.5 mV, 50 kohms Phono:

Tape Play: 150 mV, 50 kohms Tape Rec: 150 mV, 3.5 kohms

(PH)

Phono Overload: 180 mV r.m.s. at 1 kHz, 0.04%

T.H.D.

Phono: 85 dB (at 10 mV input Signal-to-Noise Ratio:

IHF A weighted)

65 dB (IHF C weighted)

95 dB (IHF A weighted) Tape: 90 dB (IHF C weighted)

0.8 mV at Volume Control: min.

Residual Hum & Noise: ±12 dB at 100 Hz Tone Controls: Bass:

Treble: ±12 dB at 10 kHz

High Filter: 6 kHz (6 dB/oct)

Loudness (-30 dB): +9 dB at 40 Hz

+5 dB at 20 kHz

TUNER SECTION

FM:

Tuning Range: 88 – 108 MHz (D model)

87.5 MHz - 108 MHz

(G/W model)

Mono: Usable Sensitivity:

11.2 dBf,  $2 \mu V$ Stereo: 19.2 dBf,  $5 \mu V$ 

50 dB Ouieting

Sensitivity: Mono: 17.2 dBf, 4  $\mu$ V

37.2 dBf, 40 μV Stereo:

Capture Ratio: 1.5 dB

Image Rejection Ratio: 60 dB

IF Rejection Ratio: 85 dB

Spurious Rejection Ratio: 85 dB

Signal-to-Noise Ratio: Mono: 70 dB

Stereo: 65 dB

Alternate Channel Att: 60 dB

AM Suppression Ratio: 52 dB Harmonic Distortion: Mono:

0.15% Stereo: 0.3%

Frequency Response:  $30 \text{ Hz} - 15,000 \text{ Hz} (\pm 1.5 \text{ dB})$ 

Stereo Separation: 40 dB at 1 kHz

30 dB at 100 Hz - 10,000 Hz

Muting Level:  $14.7 \text{ dBf}, 3 \mu\text{V}$ Stereo Threshold: 14.7 dBf,  $3 \mu V$ 

Servo Lock Level:  $14.7 \text{ dBf}, 3 \mu\text{V}$ 

AM:

Tuning Range: 525 - 1,620 kHz

Usable Sensitivity: 25 uV Image Rejection Ratio: 45 dB IF Rejection Ratio: 30 dB Signal-to-Noise Ratio: 40 dB Harmonic Distortion: 0.8%

**GENERAL** 

Power Supply: AC 120 volts, 60 Hz (D model)

> AC 220 volts, 50 Hz (G model) AC 220/120 volts, 50/60 Hz

(W model)

Outputs: Speaker A & B, Phones, Tape

Rec Out 1 & 2, AC Outlet (x 2) (D model)

Inputs: Phono, Tape Play 1 & 2

FM and AM Antennas

Antennas: FM: 300 ohms balanced and

75 ohms unbalanced built-in ferrite core

AM: antenna and external

terminal

Semiconductors: 1 FET, 20 transistors, 11 ICs,

38 diodes (D & W model) 1 FET, 22 transistors, 11 ICs.

38 diodes (G model)

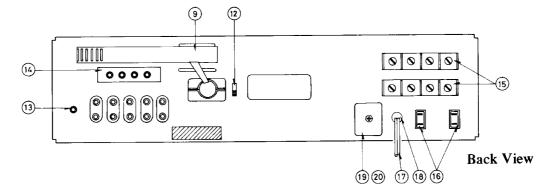
Dimensions (W x H x D):  $480 \times 130 \times 376 \text{ mm}$ 

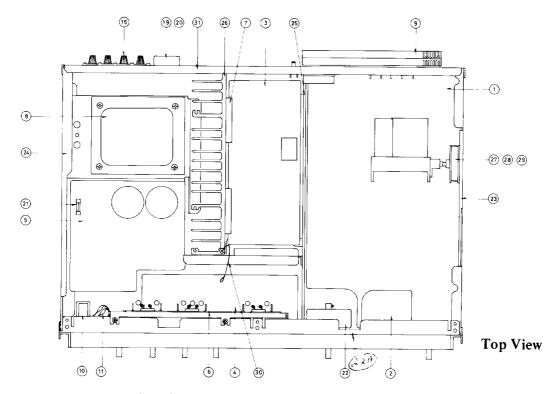
19" x 5-1/8" x 14-13/16"

Weight: 11.4 kg, 25.1 lbs

Specifications and features are subject to change without notice.

# COMPONENT LOCATION

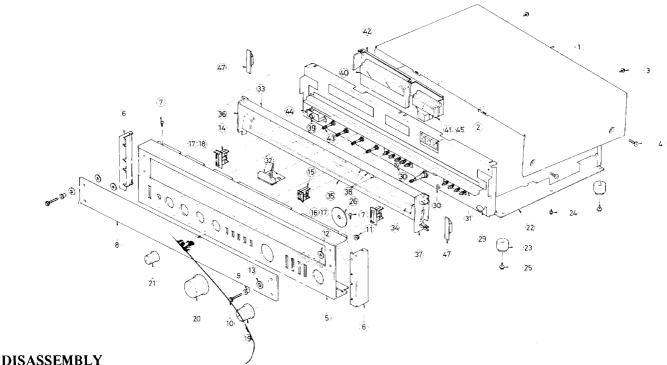




# COMPONENT LOCATION-PARTS LIST

COIV	HONENT	LOCATIO	N-FAKIS LISE				
D/W	model			31		27120200	Back panel (D)
,	model					27120202	Back panel (W)
REF. NO.	CIRCUIT NO.	PARTS NO.	DESCRIPTION			252025 250143	2.5A-T, AC fuse(W) FF-1S4, Fuseholder(W)
1		13549581A	NARFE-781a, FM/AM tuner				(on the chassis)
			and equalizer amplifier p.c.b.			27300288	Switch locked plate(W)
2		13549583	NASW-783, Switch p.c.b.			25065109	NSS-2255P, Voltage selector
3		13549584	NADA-784, Power amplifier				switch(W) (on the back panel)
			p.c.b.	G m	odel		
4		13549586	NAAF-786, Tone amplifier				
			p.c.b. (D)	REF.	CIRCUIT NO.	PARTS NO.	DESCRIPTION
		13550586B	NAAF-786b, Tone amplifier	NO.			
			p.c.b. (W)	1		13552581	NARFE-781, FM/AM tuner and
5		13549585	NAPS-785, Power supply circuit	•			equalizer amplifier p.c.b.
			p.c.b.	2		13549583	NASW-783, Switch p.c.b.
6		13549587	NAPL-787, Meter illumination	3		13549584	NADA-784, Power amplifier
_			lamp p.c.b.	4		4000000	p.c.b.
7	Q503, Q603	222022	STK-0050II, Power amplifier IC	4		13552586A	NAAF-786a, Tone amplifier
8	T901	250350	NPT-696D, Power transformer (D)	5		125525054	p.c.b.
	X 1.52	250361	NPT-696DG, Power transformer (W)	3		13332383A	NAPS-785a, Power supply
9	L152	232066	NMA-3012, AM bar antenna	6		13549587	circuit p.c.b.
10	C951	3500054	0.01µF, 125V, CS capacitor(D)	U		13349367	NAPL-787, Meter illumination
	C951, C952	3500058	PME265MB510, IS capacitor	7	Q503, Q603	222022	lamp p.c.b. STK-0050II, Power amplifier IC
1.1	R528, R628	441623314	(W) 330Ω, 1W, Metal oxide film	8	T901	250351	NPT-696G, Power transformer
11	K328, K628	441023314	resistor	9	L152	232066	NMA-3012, AM bar antenna
12	S706	25065016	NSS-2327, Slide switch	10	C951	3500058	PME265MB510, IS capacitor
13	P804	25060008	Ground terminal	îĭ		441623314	330Ω, 1W, Metal oxide film
14	P805	250600035	NTM-4PRMC06, Antenna		110 20, 110 20		resistor
17	1 003	23000033	terminal	12	S706	25065016	NSS-2327, Slide switch
15	P806, P807	25060038	NTM-4PRMN09, Speaker	13	P804	25060008	Ground terminal
10	1000,1007	20000000	terminal	14	P805	25060035	NTM-4PRMC06, Antenna
16	P901, P902	25050032	S-I6444-01, AC outlet				terminal
17	W901	253099A	AS-UC-3, Power supply cord(D)	15	P806, P807	25060038	NTM-4PRMN09, Speaker
		253083	AS-CEE, Power supply cord(W)				terminal
18	W901a	270025	SR-3P-4, Strainrelief (D)	17	W901	253083	AS-CEE, Power supply cord
		270280	SR-4K-4, Strainrelief (W)	18	W901a	270280	SR-4K-4, Strainrelief
19	F501, F601	252014	4A-T, Speaker protection fuse	19	F501, F601	252014	4A-T, Speaker protection fuse
20		25050004	Fuseholder	20		25050004	Fuseholder
21	F901	252049	4A(ST-6), AC fuse(D) (on the	21	F901	252074	2A-SE-EAK, AC fuse
			power supply p.c.b.)		F902, F903	252078	5A-SE-EAK (on the power
		252014	4A-T, AC fuse(W) (on the	22		22222	supply p.c.b.)
			power supply p.c.b.)	22		27205021	Drive shaft
22		27205021	Drive shaft	23		27115058	Side bracket (R)
23		27115058	Side bracket (R)	24 25		27115059	Side bracket (L)
24		27115059	Side bracket (L)	26		27115060	Center bracket
25		27115060	Center bracket	26 27		27160062A	
26		27160062A 270760A	Dial drum	28		270760A 273803A	Dial drum
27 28		270760A 273803A	SP-14A, Spring	29		273803A 273903	SP-14A, Spring
28 29		273903A 273903	Stringing	30		273812	Stringing Spring for pointer lamp
30		273812	Spring for pointer lamp	31		27120201	Back panel (D)
30		2/3012	Spring for pointer ramp	<i>J</i> 1		2,120201	Dack pallel (D)

# **EXPLODED VIEW**



### **Top Cover**

Remove the four screws (4) holding the top cover and side bracket

Remove the two screws (3) holding the top cover and back panel.

#### Front Panel

Remove the top cover.

Remove the TUNING knob.

Remove the five screws holding the front panel and front bracket.

#### **Bottom board**

Remove the four screws (24) holding the bottom board and chassis.

Remove the four screws (25) holding the bottom board and legs.

### Meters

Remove the top panel.

Remove the two screws holding the lamp bracket and front baracket.

#### **Dial Glass**

Remove the four screws holding the dial glass and front panel.

Notes: The dial glass has been mounted by applying an 800 gr torque to the screws.

If the dial glass is removed during repairs, and a torque driver is available, apply 800 gr torque to the screws when replacing. If however, a torque driver is not available, simply tighten the screws by hand. When replacing the dial glass, insert all relevant component parts (9-13) in accordance with the exploded view.

### Pointer Lamp

Remove the top cover and front panel.

## SERVICE PROCEDURES

#### Sensor Switch (SENSOR)

This switch enables the servo lock system for automatic FM tuning to be matched with the various operating conditions. Set it at LOW initially. Switch to NORM or HIGH if the TUNED lamp does not instantly turn off when you touch the tuning knob.

#### Power Meter/Signal Strength Meter

When the tuning is not being operated, this meter displays the level of power applied to the right speaker system. The instant the tuning knob is touched, the meter changes to display the signal strength of the radio broadcast being received at that moment. Tune a station so the needle moves as far to the right as possible.

## De-emphasis switch (Only W model)

The 25  $\mu$ sec/Normal selector switch for Dolby FM boadcasts is located on the front panel. The 50  $\mu$ sec/75  $\mu$ sec selector switch employed in the W (120/220V) model is located on the bottom board. When shipped from the factory, this switch is set to the 50  $\mu$ sec position. For use in 75  $\mu$ sec regions, switch over to the 75  $\mu$ sec position.

#### Voltage conversion (Only W model)

This set may be set to operated at either 120V or 220V at 50Hz to 60Hz. This voltage selector switch is located on the back panel. If a voltage change, is necessary, remove the lock plate, switch to the proper voltage, and replace the plate.

### **EXPLODED VIEW - PARTS LIST**

D model			G/W mo	del	
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	28184071	Top cover	1	28184072	Top cover
2	28140020	4tx10x40, Cushion	2	28140020	4tx10x40, Cushion
3	834430062	3STS+6BQ(BC), Tapping screw	3	834430062	3STS+6BQ(BC), Tapping screw
4	838440083	4STB+8CQ(BC), Tapping screw	4	838440083	4STB+8CQ(BC), Tapping screw
5	13549121	Front panel ass'y (5, 6, 14, 15)	5	13549121	Front panel ass'y (5, 6, 14, 15)
6	28125076	End cap	6	28125076	End cap
7	834130062	3STS+6BQ, Tapping screw	7	834130062	3STS+6BQ, Tapping screw
8	28191050	Dial glass	8	28191050	Dial glass
9\	~27270014	Spacer	9	27270014	Spacer
10	27300038A	Special screw	10	27300038B	Special screw
11	86213010	WN3x10FN, Nut	11	86213010	WN3x10FN, Nut
12	870051	10x3.5x1.5t, Washer	12	870051	10x3.5x1.5t, Washer
13 -	~870052	10x6x1.5t, Washer	13	870052	10x6x1.5, Washer
14	27267063	Guide for power switch knob	14	27267063	Guide for power switch knob
15	27267064	Guide for push switch knob	15	27267064	Guide for push switch knob
16	28320399	Push switch knob	16	28320399	Push switch knob
17	27180049	Spring for knob	17	27180049	Spring for knob
18	28320398	Power switch knob	18	28320398	Power switch knob
19	28320396	Volume control knob	19	28320396	Volume control knob
20	28320408	Tuning knob	20	28320408	Tuning knob
21	28320397	Tone control knob	21	28320397	Tone control knob
22	27170071	Bottom board	22	27170071	Bottom board
23	27175009	T-C, Leg	23	27175009	T-C, Leg
24	831130082	3STW+8BQ, Tapping screw	24	831130082	3STW+8BQ, Tapping screw
25	831130122	3STW+12BQ, Tapping screw	25	831130122	3STW+12BQ, Tapping screw
26	28140126	Cushion	26	28140126	Cushion
29	27185002A	DP-16N, Dial pulley	29	27185002A	DP-16N, Dial pulley
30	27185006	Dial pulley	30	27185006	Dial pulley
31	27130192	Bracket	31	27130192	Bracket
32	13549131	Pointer ass'y	32	13549131	Pointer ass'y
33	28133023	Back plate	33	28133023	Back plate
34	28130087	Dial plate	34	28130087	Dial plate
35	27190065	Holder for dial plate	35	27190065	Holder for dial plate
36	27250039A	Lamp case (L)	36	27250039A	Lamp case (L)
37	27250040A	Lamp case (R)	37	27250040A	Lamp case (R)
38	28198527	Facet	38	28198527	Facet
39	25045018	LJ-100-J, Stereo headphone jack	39	25045018	LJ-100-J, Stereo headphone jack
40	243117	NIND-0500S117 (Pointer: white),	40	243117	NIND-0500S117(Pointer: White),
		Signal strength and output level			Signal strength and output level
		meter			meter
	243129	NIND-0500S129 (Pointer: Red)		243129	NIND-0500S129 (Pointer: Red)
41	243118	NIND-0250S118 (Pointer: White),	41	243118	NIND-0250S118 (Pointer: White),
		Center meter			Center meter
	243130	NIND-0250S130 (Pointer: Red),		243130	NIND-0250S130 (Pointer: Red),
		Center meter			Center meter
42	27130193	Bracket for meter	42	27130193	Bracket for meter
43	25030150	NRS-144-40Y, Speaker selector	43	25030150	NRS-144-40Y, Speaker selector
		switch	4.4	25025156	switch
44	25035047	NPS-111L12P, Power switch	44	25035176	NPS-111-L140, Power switch (G)
45 ·	210078	PL12V0.03AW-4, Locked, Tuned,	4.5	25035034	NPS-121-L, Power switch (W)
4.7	1.6240500	and Stereo indicator lamp	45	210078	PL12V0.03AW-4, Locked, Tuned,
47	15349599	NAPL-799, Dial illumination lamp	47	1.5240500	and Stereo indicator lamp
		p.c.b.	47	15349599	NAPL-799, Dial illumination lamp
					p.c.b.

(W): Only 12/220 V model (G): Only 220 V model (D): Only 120 V model

#### **PRECAUTIONS**

#### Fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

Speaker protection fuse: The speaker protection fuse is located on the back panel. Remove the screw holding the fuse cover and fuse case.

Rating: 4A-T (Parts No.: 252014)

AC fuse: Remove the top cover. The AC fuse is located on the power supply pc board.

Rating: F901 4A (ST-6) (Parts No.: 252049) (Only 120V model)

F901 2A-SE-EAK (Parts No.: 252074) (Only 220V model) F902, F903 5A-SE-EAK (Parts No.: 252078) (Only 220V model)

F901 4A-T (Parts No.: 252014) (Only 120/220V model)

F902 2.5A-T (Parts No.: 252025) (Only 120/220V model) (on the chassis)

# **ALIGNMENT PROCEDURES**

### **INSTRUMENTS REQUIRED**

- 1. DC Voltmeter
- 2. AM Sweep Generator
- 3. AM/FM Signal Generator
- 4. AC VTVM
- 5. Oscilloscope
- 6. Monitorscope
- 7. Distortion Analyzer
- 8. Stereo Modulator
- 9. Frequency Counter

#### GENERAL ALIGNMENT CONDITIONS

- 1. Signal input should be kept as low as possible.
- 2. Standard modulation is 400Hz 30% (AM), 1kHz 100% (FM MONO), pilot 9% sub and main 91% (FM STEREO).
- 3. Standard knob position

SPEAKERS
BASS, TREBLE & BALANCE Center
HIGH FILTER OFF
MODE STEREO
DE-EMPHA NORMAL
LOUDNESS OFF
MUTING LOCK OFF
TAPE 1 2 OFF (SOURCE)

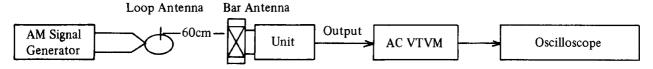
# (1) AM IF ALIGNMENT

- 1. Set SELECTOR switch to AM.
- 2. Set radio dial to quiet point.



Set signal	Adjust	Oscilloscope	Remarks
455kHz	<b>X</b> 151	Maximum Symmetrical Response	Usually not necessary to adjust

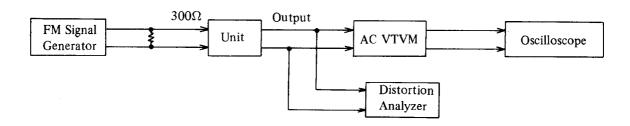
# (2) AM RF ALIGNMENT



Step	Set Signal	Set Radio Dial	Adjust	VTVM reading	Remarks	
1	515kHz 400Hz 30%	Lower end (515kHz)	L153	Maximum	Repeat steps 1 and	
2	1680kHz 400Hz 30%	Upper end (1680kHz)	TC152	Maximum	2 as necessary	
3	600kHz 400Hz 30%	600kHz	L151	Maximum	Repeat steps 3 and	
4	1400kHz 400Hz 30%	1400kHz	TC151	Maximum	4 as necessary	

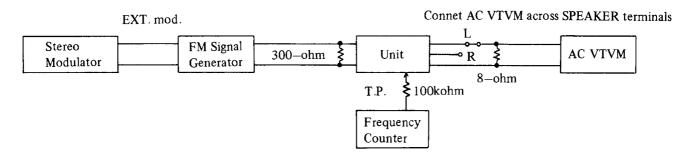
# (3) FM FRONT END ALIGNMENT

- 1. Set SELECTOR switch to FM.
- 2. Connect FM Signal Generator to 300-ohm antenna terminals.

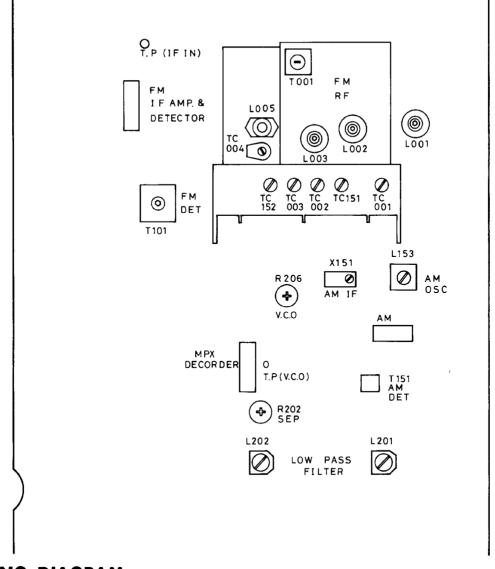


Step	FM Signal Generator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks	
1	No signal	Quiet Point	T101 Bottom	Tuning Indicator	Center	Repeat Steps 1	
2	98MHz 65dBf 1kHz 75kHz div.	98MHz	T101 Top	Distortion Analyzer	Minimum	and 2 as necessary	
3	90MHz 65dBf 1kHz 75kHz div.	90MHz	L005	Tuning	Center Repeat Steps		
4	106MHz 65dBf 1kHz 75kHz div.	106MHz	TC004	Indicator	Center	and 4 as necessary	
5	90MHz 20dBf 1kHz 75kHz div.	90MHz	L001~L003	AC VTVM or	Maximum	Repeat Steps 5	
6	106MHz 20dBf 1kHz 75kHz div.	106MHz	TC001~TC003	Oscilloscope	Maximum	and 6 as necessary	
7	98MHz 65dBf 1kHz 75kHz div.	98MHz	T001	Distortion Analyzer	Minimum		

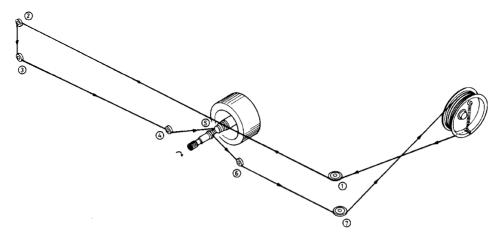
# (4) MULTIPLEX ALIGNMENT



Step	FM Signal Generator	Stereo Modulator	Dial to set	Adjust	Output Indicator	Adjust for	Remarks
1	98MHz no mod. 65dBf	_	98MHz	R206	Frequency Counter	19000±19Hz	
2	STEREO INDICATOR should light up when stereo program is being received.						
3	98MHz EXT. Mod. 65dBf	Pilot Sig. 9% Main & Sub Sig. 1KHz Lch 91%	98MHz	R202	AC VTVM Right ch.	Minimum	Repeat Steps 3 & 4 as
4	Same as above	Pilot Sig. 9% Main & Sub Sig. 1KHz Rch 91%	98MHz	R202	AC VTVM Left ch.	Minimum	necessary



# STRINGING DIAGRAM

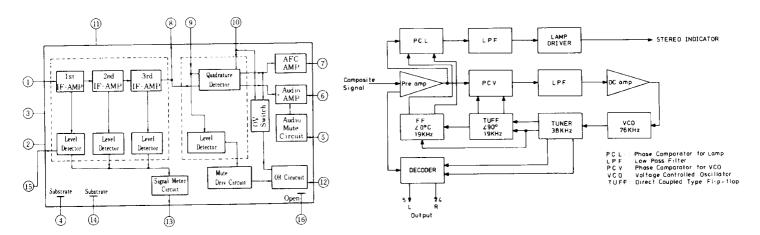


- 1. Close the variable capacitor complete and tie the dial cord to the spring of the drum.
- 2. Thread the dial cord in the direction of arrow from ① to ④ and wind the dial cord three turns around the tuning shaft clockwise.
- 3. Thread the dial cord 6 and 7.
- 4. Wind the dial cord 1½ turns around the dial drum.

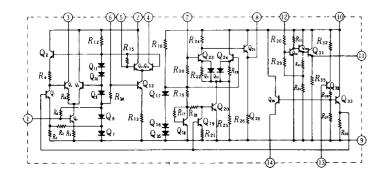
# IC BLOCK DIAGRAM

# HA-1137 BLOCK DIAGRAM

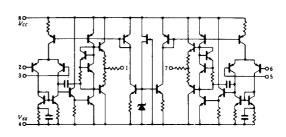
# LA3350 BLOCK DIAGRAM



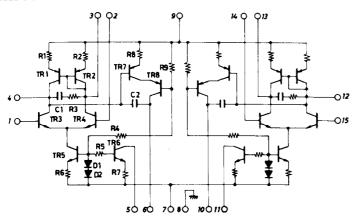
# HA-1151 EQUIVALENT CIRCUIT



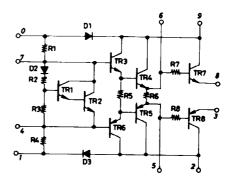
# NJM4558D, 4559DX



# STK3062



## STK-0050II



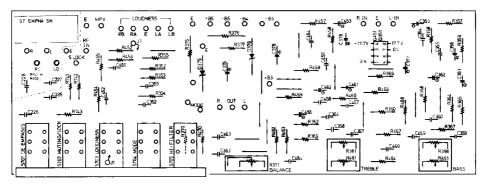
# PRINTED CIRCUIT BOARD-PARTS LIST (D/W model)

# FM/AM TUNER AND EQUALIZER AMPLIFIER PC BOARD (NARFE-781a) — PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION			
	ICs				
Q102 Q151 Q201 Q301, Q401 Q701	222421 222418 222449 222534 222465	HA1137W HA1151 LA3350 NJM4559DX NJM4558D	C304, C404 C309, C409 C311, C312 C702 C703 C706	352721019T 392880227T 352780339T 352780109T 352742209T	100μF, 6.3V, Elect. 2.2μF, 50V, LL 3.3μF, 50V, Elect. 1μF, 50V, Elect. 22μF, 16V, Elect. 0.47μF, 50V, Elect.
	Transistors		C707	352784799T 352741009T	10μF, 16V, Élect.
Q001 Q002 Q003 Q101	2211815 2211845 2211342 2211722, 2211723 or 2210823	2SK19TM-GR, F.E.T 2SC785TM-O(ONK) 2SC461(B) 2SC1923(O), 2SC1923(R) or 2SC1675(L-1)	C708 C709 C710 C711 C713 C714	352784799T 352732209T 352744709T 352721019T 352742219 352741009T	0.47μF, 50V, Elect. 22μF, 10V, Elect. 47μF, 16V, Elect. 100μF, 6.3V, Elect. 220μF, 16V, Elect. 10μF, 16V, Elect.
Q202 Q203	2211256 2211256,	2SC1815(BL) 2SC1815(BL),		Resistors	
Q702~Q704 Q706~Q708 Q705	2211256, 2211255 or 2210746 2211256 Diodes	2SC1815(GR) or 2SC945(A)P 2SC1815(BL)	R202 R206 R356, R456	5225024 5225019 5148042	N10HR1KBD, Semi-fixed N10HR4.7KBD, Semi-fixed N16RGL100KBTP40, Volume control variable
D001	223110	1S2687		Switch	
D101, D102 D151, D153	223105 223105	1S1555 1S1555	S801~S804	25035186	NPS-242-222-L150, Selector/ Tape monitor
D152 D202	4000022 223105	VD1212 1S1555	2001	Terminals	AIDY ADDDY 44 DI
D701, D702 D704~D708			P801	25045020	NPJ-4PDBL11, Phono/ Tape rec. 2
D703	224011 or 223943	YZ047 or RD4.7EB	P802	25045041	NPJ-6PDBL18, Tape 1/ Tape pb. 2
	Coils			Shielded case	
L001	233106 or 233088-1	NFA-3009 or FFA-3001		27225029 Shielded plate	
L002 L003	233112 233113	NFRF-3008 NFRF-3009		27150085	
L004 L005	233152 233090	NFT-1503 NFO-3003	POWER A	MPLIFIER P	PC BOARD
T 1 0 1 T 1 0 2	222105	NCH 1006			
L101, L102 L103	233105 233114	NCH-1005 NCH-1009	*	4) — <b>PARTS</b>	LIST
L103 L151	233114 233152	NCH-1009 NFT-1503	(NADA-784 CIRCUIT NO.	PARTS NO.	LIST DESCRIPTION
L103	233114 233152 232065 233021 or	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or	CIRCUIT NO.	PARTS NO. ICs	DESCRIPTION
L103 L151 L153	233114 233152 232065	NCH-1009 NFT-1503 NMO-2002	Q501, Q601 Q502, Q602	PARTS NO. ICs 222023 222502	DESCRIPTION STK3062 NJM4558DX
L103 L151 L153 L201, L202	233114 233152 232065 233021 or 233107 <b>Transformers</b> 233085	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002	CIRCUIT NO.  Q501, Q601	PARTS NO. ICs 222023	DESCRIPTION STK3062
L103 L151 L153 L201, L202	233114 233152 232065 233021 or 233107 <b>Transformers</b> 233085 233101 or 233083	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904,	PARTS NO. ICs 222023 222502 222022	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y)
L103 L151 L153 L201, L202	233114 233152 232065 233021 or 233107 <b>Transformers</b> 233085 233101 or	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or
L103 L151 L153 L201, L202	233114 233152 232065 233021 or 233107 <b>Transformers</b> 233085 233101 or 233083 232041	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904,	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255,	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR),
L103 L151 L153 L201, L202 T001 T101 T151	233114 233152 232065 233021 or 233107 <b>Transformers</b> 233085 233101 or 233083 232041 <b>Ceramic filters</b> 3010003	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 352741009T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100µF, 16V, Elect. 4.7µF, 25V, Elect. 10µF, 16V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555 1N60 or 1K60 1S1588
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 TC004 C021 C106 C108 C109 C118	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 3527780209T 352750339T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108 C109 C118 C153 C158	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 352741009T 352750339T 372523614 352741009T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.60pF±5%, 50V, ST 10μF, 16V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223103 C23103 C23103 C23132 C23132 C23132 C23148 or	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555 1N60 or 1K60 1S1588 GP-08B or
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C163 C165	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 352741009T 352750339T 3725523614 352741009T 352780339T 352780339T 352780339T 352780339T 352780339T 352780339T 352780339T 352780339T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, SV, ST 10μF, 16V, Elect. 120μF, 16V, Elect. 120μF, 16V, Elect. 13.3μF, 50V, Elect. 13.3μF, 50V, Elect. 100μF, 6.3V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511,	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804 233105	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555 1N60 or 1K60 1S1588 GP-08B or SR1K-2
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C165 C201	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 3527780299T 3527780299T 3527780299T 352778029T 352778229T 3527780339T 372523614 35274219	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 33μF, 25V, Elect. 360pF±5%, 50V, ST 10μF, 16V, Elect. 220μF, 16V, Elect. 120μF, 16V, Elect. 120μF, 16V, Elect. 120μF, 50V, Elect. 13μF, 50V, Elect. 13μF, 50V, Elect. 10μF, 6.3V, Elect. 100μF, 6.3V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804 233105 Capacitors 352780339T 352780109T	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555  1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555  3.3µF, 50V, Elect. 1µF, 50V, Elect.
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108 C109 C118 C153 C153 C155 C162 C163 C165 C201 C202 C203	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 35274209T 352742219 352780109T 352780109T 352744109T 3527780109T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.3μF, 25V, Elect. 3.3μF, 25V, Elect. 3.3μF, 50V, Elect. 220μF, 16V, Elect. 220μF, 16V, Elect. 10μF, 50V, Elect. 10μF, 50V, Elect. 10μF, 6.3V, Elect. 100μF, 6.3V, Elect. 100μF, 16V, Elect. 1μF, 50V, Elect. 100μF, 16V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514 C613, C614 C516, C616	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804 233105 Capacitors 352780339T 352780109T 352780479T	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555  1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555  3.3μF, 50V, Elect. 1μF, 50V, Elect. 4.7μF, 50V, Elect.
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108 C109 C118 C153 C153 C158 C159 C162 C165 C201 C202 C203 C204 C205	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 35274009T 352780109T 352744019T 352744109T 352744109T 352744109T 352744109T 352744109T 352744109T 35274109T 39288339TT 39288229TT	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 33μF, 25V, Elect. 360pF±5%, 50V, ST 10μF, 16V, Elect. 220μF, 16V, Elect. 1μF, 50V, Elect. 1μF, 50V, Elect. 10μF, 16V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514 C613, C614 C516, C616 C751, C752	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223105 223103 or 223132 233119 223848 or 223848 or 223804 233105 Capacitors 352780339T 352780139T 352780479T 392852207T 352780339T 352780339T 352780339T 352780339T 352780339T 352780339T 352780339T	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555  1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555  3.3μF, 50V, Elect. 1μF, 50V, Elect. 4.7μF, 50V, Elect. 22μF, 25V, LL 3.3μF, 50V, Elect. 2.2μF, 50V, Elect.
L103 L151 L153 L201, L202  T001 T101 T151  X101, X102 X151  VC001~VC004 TC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C163 C165 C201 C202 C203 C204 C205 C206 C207	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 352741009T 352741009T 352741009T 352741019T 352744719 352780109T 352744719 352780109T 352744719 352780109T 352780109T 352780109T 352780109T 352780109T 352781019T 352781019T 352781019T 352781019T 352781019T 352781019T 352781109T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 10μF, 16V, Elect. 10μF, 16V, Elect. 32μF, 50V, Elect. 33μF, 25V, Elect. 33μF, 25V, Elect. 33μF, 50V, Elect. 10μF, 16V, Elect. 120μF, 16V, Elect. 1μF, 50V, Elect. 10μF, 16V, Elect.	Q501, Q601 Q502, Q602 Q503, Q603 Q751, Q752 Q903, Q904, Q906 Q905 D501, D502, D601, D602 D751~D754, D757 D755, D756 D908 D909, D910 C501, C601 C506, C606 C510, C511, C610, C611 C513, C514 C613, C614 C516, C616 C751, C752 C753, C754 C921	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223804 233105 Capacitors 352780339T 352780109T 352780339T	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555  1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555  3.3μF, 50V, Elect. 1μF, 50V, Elect. 4.7μF, 50V, Elect. 2.2μF, 50V, Elect. 2.2μF, 50V, Elect. 10μF, 50V, Elect. 2.2μF, 50V, Elect. 33μF, 50V, Elect.
L103 L151 L153 L201, L202 T001 T101 T151 X101, X102 X151 VC001~VC004 C021 C106 C108 C109 C118 C153 C158 C159 C162 C163 C165 C201 C202 C203 C204 C205 C206	233114 233152 232065 233021 or 233107  Transformers 233085 233101 or 233083 232041  Ceramic filters 3010003 3010004  Capacitors 4 3050006 3060003 352741019T 352750479T 352741009T 35278039T 372523614 352741009T 352780109T 352780109T 352780109T 352780109T 352780109T 352780109T 352780109T 352780109T 352741719 352780109T 352741719 352780109T 352744719 352780109T	NCH-1009 NFT-1503 NMO-2002 NMC-8-5 or NMC-5002 NIT-0518 NFIF-6003 or NIT-3516 NIT-0509 SFE-10.7MA CFZ-455C NVC-20FQ327WD02, Variable NTC-10P02, Trimmer 100μF, 16V, Elect. 4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 33μF, 25V, Elect. 33μF, 25V, Elect. 30μF, 16V, Elect. 220μF, 16V, Elect. 10μF, 16V, Elect. 10μF, 16V, Elect. 10μF, 50V, Elect. 10μF, 50V, Elect. 10μF, 50V, Elect. 10μF, 16V, Elect.	CIRCUIT NO.  Q501, Q601 Q502, Q602 Q503, Q603  Q751, Q752 Q903, Q904, Q906  Q905  D501, D502, D601, D602 D751~D754, D757 D755, D756 D908  D909, D910  C501, C601 C506, C606 C510, C511, C610, C611 C513, C514 C613, C614 C516, C616 C751, C752 C753, C754	PARTS NO. ICs 222023 222502 222022 Transistors 2211544 2211255, 2211256 or 2210746 2211455 or 2210803 Diodes 223105 223103 or 223132 233119 223848 or 223804 233105 Capacitors 352780339T 352780109T 352780339T 352780229T 35278029T 352781009T	DESCRIPTION  STK3062 NJM4558DX STK-0050II  2SC1959(Y) 2SC1815(GR), 2SC1815(BL) or 2SC945(A)P 2SA1015(GR) or 2SA733(P)  1S1555  1N60 or 1K60 1S1588 GP-08B or SR1K-2 1S1555  3.3μF, 50V, Elect. 1μF, 50V, Elect. 4.7μF, 50V, Elect. 2.2μF, 50V, Elect. 2.2μF, 50V, Elect. 10μF, 50V, Elect.

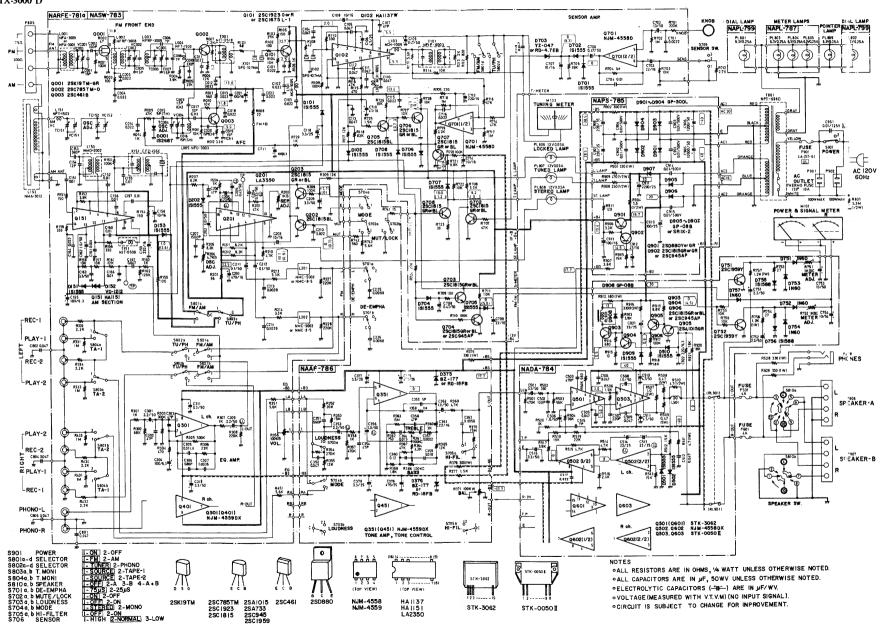
	Resistors		C362, C462	352780109T	$1\mu$ F, 50V, Elect.
R507, R607 R508, R509,	451730104 4000047	$1\Omega$ , 2W, Metal $0.47\Omega$ , 5W, Metal plate	C375, C376 C377, C378	352754719T 352750339T	$470\mu\text{F}, 25\text{V}, \text{ Elect.}$ 3.3 $\mu\text{F}, 25\text{V}, \text{ Elect.}$
R608, R609	5225010	•		Resistors	
R751, R752 R757, R758 R912	5225018 441621224 441621814	N10HR1KBC, Semi-fixed 1.2kΩ, 1W, Metal oxide film 180Ω, 1W, Metal oxide film	R361, R461	5148038	N16RGM11C100KCO40, Treble control variable
K912	Coil	1 8032, 1 W, Metal Oxide Illili	R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
L501, L502	231001	S-1.3B	R371, R471	5146017	N16RLC100KWTP40, Balance control variable
	Relay		R375	441623314	330Ω, 1W, Metal oxide film
RL901	25065085A	NRL-2P5A-DC12-03		Switches	
DOMED CI	JPPLY PC I	POADD		25035174	NPS-522-L138, High filter/
	) – PARTS				Mode/Loudness/FM muting/ De-emphasis
CIRCUIT NO.	•	DESCRIPTION			De emphasis
elkeeli No.	Transistors	DESCRIPTION		PLIFIER PC	
Q901	2201075 or	25D880(V) or		(b) – PARTS	LIST
	2201073 01	2SD880(Y) or 2SD880(GR)	(W model)	DA DEC MO	DESCRIPTION
Q902	2211256,	2SC1815(GR),	CIRCUIT NO.	PARTS NO.	DESCRIPTION
	2211255 or 2210746	2SC1815(BL) or 2SC945(A)P	0251 0451	IC	NAME ASSOCIATION OF THE PROPERTY OF THE PROPER
	Diodes		Q351, Q451	222534 Diode	NJM-4559DX
D901~D904	223863	GP-30DL	D275 D276		D7 177
D905~D907	223848 or 223804	GP-08B or SR1K-2	D375, D376	224072 Capacitors	BZ-177
	Capacitors		C353, C453	392880227T	2.2μF, 50V, LL
C905, C906	3504125	12,000µF, 50V, Elect.	C356, C456	392880107T	1μF, 50V, LL
C907, C908	352762219	220μF, 35V, Elect.	C361, C461 C362, C462	352742209T 352780109T	22μF, 16V, Elect. 1μF, 50V, Elect.
C910 C911	352751019 352752229	100μF, 25V, Elect. 2,200μF, 25V, Elect.	C375, C376	352754719T	470μF, 25V, Elect.
C912 C913	352744709P	47μF, 16V, Elect.	C377, C378	352750339T Resistors	$3.3\mu$ F, 25V, Elect.
C913	352741019P	$100\mu$ F, $16$ V, Elect.	R361, R461		N14DCM11C100VCO40
R901	Resistors 441623314	2200 1W Motal axida film	K301, K401	5148038	N16RGM11C100KCO40, Treble control variable
R902	441623014	330Ω, 1W, Metal oxide film 300Ω, 1W, Metal oxide film	R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
R904	451530564 Radiator	$5.6\Omega$ , $1/2W$ , Metal	R371, R471	5146017	N16RLC100KWTP40, Balance control variable
	27160011A	Radiator	R375	441623314	330Ω, 1W, Metal oxide film
	Fuseholder	Radiatol		Switches	
	250113	SN5051		25035174	NPS-522-L138, High filter/
	Fuses	3143031			Mode/Loudness/FM muting/ De-emphasis
F901	252049	4A (ST-6)		250142	NSS-2225, De-emphasis
			METED II	LUMINIATIO	N LAMB BC BOARD
	PLIFIER PC				N LAMP PC BOARD
	) – PARTS	LIST		) – PARTS I	
( <b>D model</b> ) CIRCUIT NO.	PARTS NO.	DESCRIPTION	CIRCUT NO. PL803~PL805	PARTS NO. 210054B	DESCRIPTION PL6.3V, 0.25A, Pilot lamp
circon No.	IC	DESCRIPTION			•
Q351, Q451	222534	NJM-4559DX		) – PARTS I	NATION PC BOARD
Q551, Q451	Diode	113M-4337DA	CIRCUIT NO.	,	DESCRIPTION
D375, D376	224072 or	BZ-177 or	CIRCUIT NO.	210054A	PL6.3V, 0.25A, Pilot lamp
20.0, 20.0	224000	RD-18FB	NOTES.		, o.zori, i not tump
	Capacitors		NOTES: 1. DC voltage as	e measured with	V.T.V.M. to chassis at no signal
C353, C453	392880227T	2.2μF, 50V, LL	applied.  2. Capacitor		current type electrolytic
C356, C456 C361, C461	392880107T 352742209T	$1\mu$ F, 50V, LL $22\mu$ F, 16V, Elect.	z. Capacitoi	capacitor	
			ATTO: 4 A	ST: Polystyren f	
E AMPLIFI	FK PC BC	OARD VIEW FROM E	SULTOM SI	<b>レヒ</b> (D mode	·I)

# TONE AMPLIFIER PC BOARD VIEW FRO



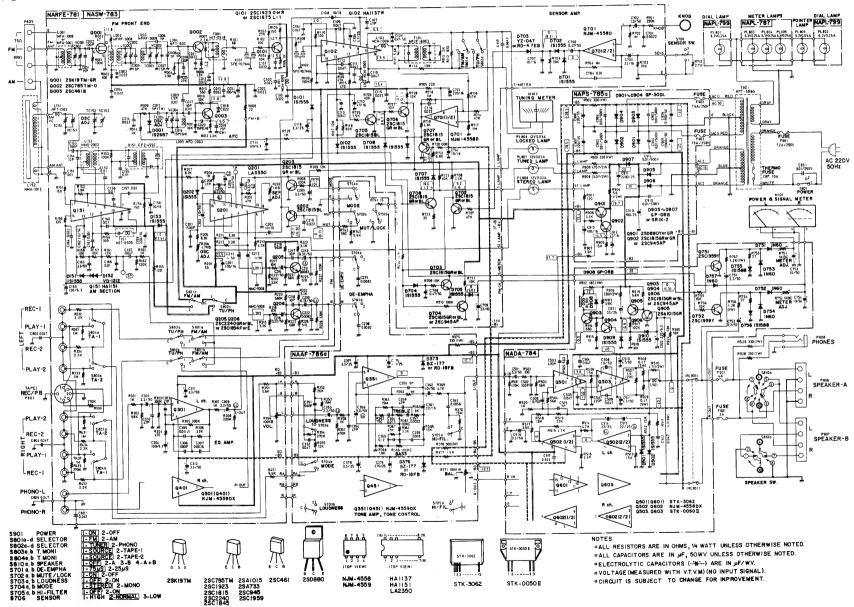
#### SCHEMATIC DIAGRAM

MODEL TX-3000 D

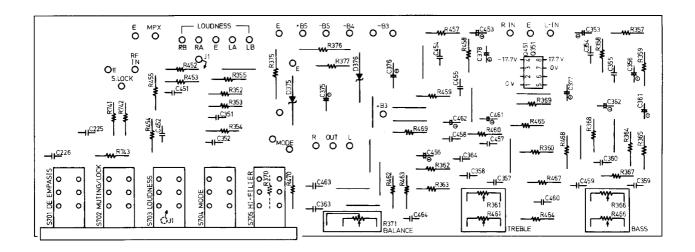


### SCHEMATIC DIAGRAM

MODEL TX-3000 G



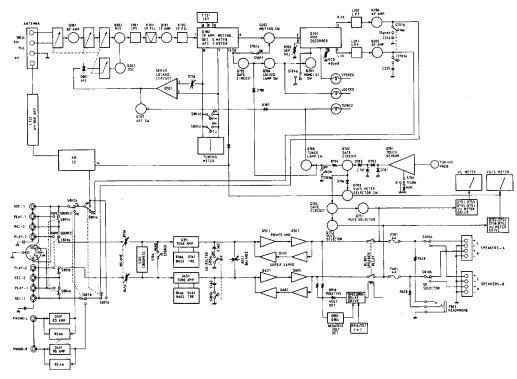
# TONE AMPLIFIER PC BOARD VIEW FROM BOTTOM SIDE (G/W model)



# PRINTED CIRCUIT BOARD-PARTS LIST

FM/AM TH	NER AND	EQUALIZER		Transformers	
	R PC BOAR	D (NARFE-781) —	T001 T101	233085 233101 or 233083	NIT-0518 NFIF-6003 or NIT-3516
CIRCUIT NO.	PARTS NO.	DESCRIPTION	T151	232041	NIT-0509
	ICs			Ceramic filters	
Q102 Q151	222421 222418 222449	HA1137W HA1151 LA3350	X102, X102 X151	3010003 3010004	SFE-10.7MA CFZ-455C
Q201 Q301, Q401	222534	NJM4559DX		Capacitors	
Q701	222465	NJM4558D	VC001~VC004 TC004	3050006 3060003	NVC-20FQ327WD02, Variable NTC-10P02, Trimmer
	Transistors		C021	352741019T	100μF, 16V, Elect.
Q001 Q002 Q003 Q101	2211815 2211845 2211342 2211722, 2211723 or 2210823	2SK19TM-GR 2SC785TM-O(ONK) 2SC461(B) 2SC1923(O), 2SC1923(R) or 2SC1675(L-1)	C106 C108 C109 C118 C153 C158	352750479T 352741009T 352782209T 352750339T 372523614 352741009T	4.7μF, 25V, Elect. 10μF, 16V, Elect. 22μF, 50V, Elect. 3.3μF, 25V, Elect. 3.60pF±5%, 50V, ST 10μF, 16V, Elect.
Q202 Q203 Q702~Q704 Q706~Q708 Q205, Q206	2211256 2211256, 2211255 or 2210746 2211405, 2211406, 2211732 or 2211733	2SC1815(BL) 2SC1815(BL), 2SC1815(GR) or 2SC945(A)P 2SC2240(GR), 2SC2240(BL), 2SC1845(E) or 2SC1845(F)	C159 C162 C163 C165 C201 C202 C203 C204	352742219 352780109T 352780339T 352721019T 352744719 352780109T 352741009T 392883397T	220μF, 16V, Elect. 1μF, 50V, Elect. 3.3μF, 50V, Elect. 100μF, 6.3V, Elect. 470μF, 16V, Elect. 1μF, 50V, Elect. 10μF, 16V, Elect. 0.33μF, 50V, LL
Q705	2211256	2SC1815(BL)	C205 C206	392882297T 392884797T	0.22µF, 50V, LL 0.47µF, 50V, LL
	Diodes		C207	372521524	1,500pF±5%, 50V, ST
D001 D101, D102 D151, D153 D152 D202 D701, D702 D704~D708	223110 223105 223105 4000022 223105	182687 181555 181555 VD1212 181555	C209 C211, C212 C215, C216 C219, C220 C301, C401 C304, C404 C309, C409	352780339T 352780109T 392883397T 352780229T 352721019T 392880227T	3.3μF, 50V, Elect. 1μF, 50V, Elect. 0.33μF, 50V, LL 2.2μF, 50V, Elect. 100μF, 6.3V, Elect. 2.2μF, 50V, LL
D703	224011 or 223943	YZ047 or RD4.7EB	C311, C312 C702 C703	352780339T 352780109T 352742209T	3.3μF, 50V, Elect. 1μF, 50V, Elect. 22μF, 16V, Elect.
	Coils	NEA 2000	C706	352784799T	0.47µF, 50V, Elect.
L001 L002 L003 L004 L005 L101, L102	233106 or 233088-1 233112 233113 233152 233090 233105	NFA-3009 or FFA-3001 NFRF-3008 NFRF-3009 NFT-1503 NFO-3003 NCH-1005	C707 C708 C709 C710 C711 C713 C714	352741009T 352784799T 352732209T 352744709T 352721019T 352742219 352741009T	10μF, 16V, Élect. 0.47μF, 50V, Elect. 22μF, 10V, Elect. 47μF, 16V, Elect. 100μF, 6.3V, Elect. 220μF, 16V, Elect. 10μF, 16V, Elect.
L103 L151	233114 233152	NCH-1009 NFT-1503		Resistors	
L151 L153 L201, L202	232065 233126	NMO-2002 NMC-5008	R202 R206 R356, R456	5225024 5225019 5148042	N10HR1KBD, Semi-fixed N10HR4.7KBD, Semi-fixed N16RGL100KBTP40, Volume control variable

#### **BLOCK DIAGRAM**



#### CIRCUIT DESCRIPTION

#### 1. Touch sensor

The purpose of this circuit is to operate both the power/signal strength meter and servo locked circuit switching transistors.

#### 1.1 Servo locked circuit switching circuit

In order to ensure accurate tuning, the servo locked circuit is turned off automatically once the tuning knob is touched, and also when the muting circuit is switched off.

When a station is turned, Q702 will turn off and Q708 turn on (since Q705 will already be off and Q706 on), resulting in the TUNED lamp turning on. And since Q707 will turn off when Q708 turns on, the servo locked circuit will also begin to operate.

When the tuning knob is touched, a certain amount of hum is induced.

This hum is amplified by Q701, rectified by D701 and D702 into a DC signal, and applied to Q702 is consequently turned on, resulting in the servo locked circuit being switched off. If, however, the hum level is rather low, the tuned lamp might not turn on even when the tuning knob is touched. If this happens, reset the back panel sensor switch to either the Normal or High position.

#### 1.2 Power/signal strength meter

When the tuning knob is not being operated, this meter displays the level of power applied to be right speaker system. The instant the tuning knob is touched, the meter changes to display the signal strength of the radio broadcast.

When the tuning knob is touched, Q702 turns on. And since Q703 and Q704 turn off and Q751 and Q752 turn on, and power/signal strength meter is changed to signal strength meter from power meter.

#### 2. Protection circuit

The protection circuit is operated:

(1) When the B circuit is unstable when the power is turned ON (approximately 5 seconds)
(2) When the center voltage has increased because of trouble at the differential amplifier, etc.

When the voltage detector is operated by abnormal voltage Q904 is turned ON by the voltage drop across R918. Q904, Q903 constitute a digitalized, fast response Schmitt trigger circuit. When Q904 is turned ON, Q903 is turned OFF. Q903 is a relay drive transistor. When it is turned OFF, the relay is also turned OFF.

When the power switch is turned ON, charging current flows thru the loop  $R916 \rightarrow C921 \rightarrow R917 \rightarrow R918$  and Q904 is turned ON by the voltage drop across R918. Consequently, Q903 and the relay are turned OFF until the charging current drops below a certain value. When the power switch is turned OFF, the B voltage falls and C921 is quickly discharged thru the loop  $R916 \rightarrow C921 \rightarrow D909$ . During normal operation, C921 is charged to almost the B voltage. But since the saturation resistance of Q904 is sufficiently low, when Q904 is turned ON, C921 is quickly discharged thru the loop  $C921 \rightarrow R917 \rightarrow C904$  and the relay is also turned OFF. The relay is not turned ON again thereafter until C921 is charged, even if the set should return to normal and Q903 is turned OFF.

#### 3. Muting Circuit

The Quadrature detector IC incorporates an IF level detector circuit (output at pin 12). If the IF signal level drops below the muting level, pin 12 will be switched to high level, turning Q202 on. Consequently, the detector output signal will be cut off before it can be applied to the multiplex IC. When, on the other hand, the IF signal level is higher than the muting level, the Q102 pin 12 will be switched to low level, turning Q202, and Q705 off. Q706 will therefore turn on, followed by the LOCKED lamp turning on.

#### 4. Servo Locked Circuit

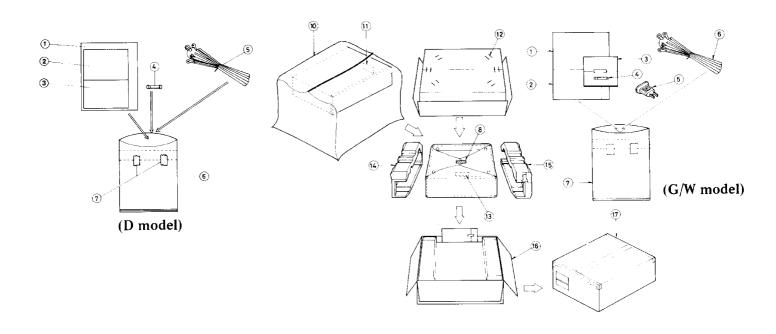
The DC potential difference across both ends of the tuning meter (corresponding to the DC portion of the ratio detector output) is amplified by the Q701 operational amplifier in order to increase the AFC control capacity.

	Switch	NDS 040 020 1 150 S. I /		Capacitors	
S801~S804	25035186	NPS-242-222-L150, Selector/ Tape monitor	C905, C906 C907, C908	3504125 352762219	12,000μF, 50V, Elect. 220μF, 35V, Elect.
	Terminals		C910	352751019	$100\mu F$ , 25V, Elect.
P801	25045020	NPJ-4PDBL11, Phono/	C911 C912	352752229 352744709P	$2,200\mu\text{F}, 25\text{V}, \text{Elect}.$ 47 $\mu\text{F}, 16\text{V}, \text{Elect}.$
P802	25045041	Tape rec. 2 NPJ-6PDBL18, Tape 1/	C913	352741019P Resistors	$100\mu$ F, $16$ V, Elect.
P803	250199	Tape pb. 2 S-13316, Din	R901, R902	441623014	300Ω, 1W, Metal oxide film
	Shielded case	·	R904	451530564	$5.6\Omega$ , $1/2W$ , Metal
	27225029			Radiator	
	Shielded plate			27160011A	Radiator
	27150085			Fuseholder	
DOWED A	MPLIFIER P	C ROAPD		25050052	SN5053
	) – PARTS			Fuses	
CIRCUIT NO.	PARTS NO.	DESCRIPTION	F901 F902, F903	252074 252078	2A-SE-EAK 5A-SE-EAK
	ICs		1 902, 1 903		0.1.02.2
Q501, Q601	222023	STK3062		Fuse label 29360364	T2A/250V
Q502, Q602 Q503, Q603	222502 222022	NJM4558DX STK-0050II	TONE AND		
Q303, Q003	Transistors				BOARD (NAAF-786a)
Q751, Q752	2211544	2SC1959(Y)	- PARTS I		DESCRIPTION
Q903, Q904	2211255,	2SC1815(GR),	CIRCUII NO.	IC	DESCRIPTION
Q906	2211256 or 2210746	2SC1815(BL) or 2SC945(A)P	Q351, Q451	222534	NJM-4559DX
Q905	2211455 or 2210803	2SA1015(GR) or 2SA733(P)	Q551, Q151	Diode	
	Diodes	25/1/33(1)	D375, D376	224072 or	BZ-177 or
D501, D502	223105	1S1555	,	224000	RD-18FB
D601, D602		1N60 or		Capacitors	
D751~D754 D757	223103 or 223132	1K60	C353, C453 C356, C456	392880227T 392880107T	2.2μF, 50V, LL 1μF, 50V, LL
D755, D756 D908	223119 223848 or	1S1588 GP-08B or	C361, C461	352742209T	22μF, 16V, Elect.
	223804	SR1K-2	C362, C462 C375, C376	352780109T 352754719T	1μF, 50V, Elect. 470μF, 25V, Elect.
D09, D910	223105	1S1555	C377, C378	352750339T	$3.3\mu$ F, 25V, Elect.
C501, C602	Capacitors 352780339T	3.3μF, 50V, Elect.		Resistors	24 CD CM 1 C1 00 7 C0 4 0
C506, C606	352780109T	1μF, 50V, Élect.	R361, R461	5148038	N16RGM11C100KC040, Treble control variable
C510, C511, C610, C611	352780479T	$4.7\mu$ F, 50V, Elect.	R366, R466	5148039	N16RGM11C100KCS40, Bass control variable
C513, C514, C613, C614	392852207T	22μF, 25V, LL	R371, R471	5146017	N16RLC100KWTP40, Balance control variable
C516, C616 C751, C752	352780339T 352780229T	3.3µF, 50V, Elect. 2.2µF, 50V, Elect.	R375,	441623314	$330\Omega$ , 1W, Metal oxide film
C753, C754	352781009T	10μF, 50V, Elect.		Switches	
C921 C922	352753309T 352722219	33μF, 25V, Elect. 220μF, 6.3V, Elect.		25035174	NPS-522-L138, High filter/
0,22	Resistors	· · ·			Mode/Loudness/FM muting/ De-emphasis
R507, R607	451730104	1Ω, 2W, Metal	MEGED H	I I INGINI ATTI	ON LAMB DC DOADD
R508, R509, R608, R609	4000047	0.47Ω, 5W, Metal plate		LUMINATIO ) – PARTS	ON LAMP PC BOARD
R751, R752	5225018	N10HR1KBC, Semi-fixed	CIRCUIT NO.	*	DESCRIPTION
R757, R758 R912	441621224 441621814	1.2kΩ, 1W, Metal oxide film 180Ω, 1W, Metal oxide film	PL803~PL805		PL6.3V, 0.25A, Pilot lamp
	Coil		DIAL DIA		NIATIONI DC DOADD
L501, L502	231001	S-1.3B		) – PARTS	NATION PC BOARD
	Relay		CIRCUIT NO.	*	DESCRIPTION
RL901	25065085A	NRL-2P5A-DC12-03	cincoii no.	210054A	PL6.3V, 0.25A, Pilot lamp
POWER SUPERING		BOARD (NAPS-785a) –		ire measured with	V.T.V.M. to chassis at no signal
CIRCUIT NO.		DESCRIPTION	applied.  2. Capacitor		ge current type electrolytic
	Transistors		-	capacitor ST: Polyetyrer	film capacitor
Q901	2201075 or	2SD880(Y) or		2. 101,00,101	
Q902	2201074 2211256,	2SD880(GR) 2SC1815(GR),			
	2211255 or 2210746	2SC1815(BL) or 2SC945(A)P			
	Diodes	25 57 10 (**)*			
D001 - D004	222062	CD 20DI			

223863 223848 or 223804

D901~D904 D905~D907 GP-30DL GP-08B or SR1K-2

# **PACKING PROCEDURES**



# PACKING PROCEDURES - PARTS LIST

(D model)	•		(W/G mode	1)	
REF. NO.	PARTS NO.	DESCRIPTION	REF. NO.	PARTS NO.	DESCRIPTION
1	29340391	Instruction manual	1	29340394	Instruction manual
2	29358002	Service station list (N)	2	29365005-2	Warranty card (V)
3	29365006	Warranty card (N)	3	29100002	Poly bag (W)
4	252014	4A-T, Fuse	4	252014	4A-T, Fuse
5	292064	FM antenna	5	25055018	CV-K-1, Conversion plug (W)
6	29100006	Poly bag	6	292064	FM antenna
7	261504	Tape	7	29100006	Poly bag
8	261504	Tape	8	261504	Tape
10	29100034	850x650mm, Poly bag	10	29100034	850x650mm, Poly bag
11	29360362	Label (N)	12	282301	Sealing hook
12	282301	Sealing hook	14	29090477	Pad (R)
13	29360363	Caution label (N)	15	29090478	Pad (L)
14	29090477	Pad (R)	16	29050332	Carton box
15	29090478	Pad (L)	17	260012	Tape
16	29050332	Carbon box		29355045	Sensor tag
17	260012	Tape			
	29355045	Sensor tag	(V): Only (	Germany model	
(N): Only 1	U.S.A. model		(W): Only V	V model	

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